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SUMMARY OF MISSIONS, NEEDS, RESOURCES, ACCOMPLISHMENTS, AND TRENDS

ENVIRONMENTAL RESEARCH LABORATORY

AUGUST 1975

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The Corvallis Environmental Research Laboratory (CERL), continues efforts to broaden the scope of environmental research work by moving in the direction of a systems approach which will include social and economic impacts. Research is conducted to develop a scientific basis for determining and predicting the ecological consequences of all aspects of environmental pollutants. The primary mission of CERL will be to develop a thorough understanding of the complex interrelationships among specific components of various ecological systems.

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Corvallis Environmental Research Laboratory

Summary of Missions, Needs, Resources, Accomplishments, and Trends

August 1975

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Missions of CERL

Throughout Fiscal 1975 the U.S. Environmental Protection Agency's three research facilities in Corvallis, Oregon, operated as part of the National Environmental Research Center (NERC-Corvallis). The facilities were the Pacific Northwest Environmental Research Laboratory (PNERL), the National Ecological Research Laboratory (NERL), and the Western Fish Toxicology Station (WFTS).

As the result of a major reorganization of the Office of Research and Development, NERC-Corvallis was abolished on June 29, 1975. The reorganization has merged PNERL, NERL, WFTS and the Arctic Environmental Research Laboratory (one of nine former associate laboratories of NERC-Corvallis) into one management unit--the Corvallis Environmental Research Laboratory (CERL).

Laboratory reorganization plans have been submitted to the Office of Research and Development in Washington for evaluation, and formal approval is expected at an early date.

Information reported herein was developed under the NERC system and was current through June 30, 1975. Ultimate approval of an organizational structure for CERL will create an environmental effects research laboratory at Corvallis with many of the responsibilities formerly held by NERC-Corvallis.

CERL will continue efforts to broaden the scope of its environmental research work by moving in the direction of a systems approach which will include social and economic impacts. Research will be conducted to develop a scientific basis for detemining and predicting the ecological consequences of all aspects of environmental pollutants.

The primary mission of CERL will be to develop a thorough understanding of the complex interrelationships among specific components of various ecological systems. Major programs of CERL will be designed to:

--Conduct research and development programs on eutrophication, lake restoration, stream degradation, and other aspects of fresh water ecology.

--Determine the fate of pollutants in marine waters, and develop a system for quantitatively assessing ecological alterations produced by pollutants.

--Develop a scientific basis for the establishment of water quality standards for fresh water, marine, and estuarine water, in temperate and arctic climates.

--Develop a scientific basis for the establishment of secondary air quality standards.

--Conduct whole-system research programs to increase the understanding of environmental stress relationships among life-support systems of air, land and water media.

--Investigate the effects of pollutants on western fish species as well as other freshwater and marine flora and fauna.

--Develop a scientific basis for predicting the fate of pollutants that enter freshwaters and for assessing the potential exposure of human and aquatic life to these pollutants.

Facility and Budget

The physical laboratory facilities of CERL will consist of what was formerly PNERL, NERL, WFTS (all in Corvallis) and the AERL in College, Alaska. The FY-75 base program budget for these entities totaled approximately $8.9 million with an additional $1.7 million in energy-related research. The projected budget for FY-76 shows approximately $7.9 million in the base program and $1.5 million in energy research. The following table shows funding by organizational unit for those units being merged to form CERL.

Summary of Funded Research for FY-75
By Organizational Unit

Organizational Unit	In-house (K)	Lab. Services Branch Cost (K)	Extramural* (K)	Total In-house and Extramural (K)
(PNERL)				
Coastal Pollution Branch	593	22	567	1,160
Eutrophication Survey Branch	668	264	235	903
Eutrophication & Lake Restoration Branch	906	52	482	1,388
Thermal Pollution Branch	133	8	375	508
Lab. Services Branch	398	-	0	398
(NERL)				
Ecological Effects of Air Pollutants	629	32	1,316	1,945
Pesticide Effects on Terrestrial Environments	160	-	348	508
Ecological Effects of Energy Activities	510	-	440	950
(WFTS)	315	6	64	379
(AERL)	604	-	1,320	1,920
TOTAL	4,916	384**	5,147	10,059

*Grants, Contracts and Interagency Agreements
**Difference between (398-384 = 14K) was incurred by the Industrial Waste Branch to which now reports to Cincinnati. Each organizational unit contributed to Lab. Services from their in-house budget, i.e., Coastal 593-22 = 571.

Professional Research Staff

The permanent professional research staff at CERL numbers 104. The staff, which consists of individuals from many disciplines, is particularly strong in the biological sciences (see next chart) enabling CERL to carry out its mission in the area of ecological effects of environmental pollutants.

CERL Professional Staff

Discipline	B.S.	B.A.	M.S.	M.A.	D.V.M	Ph.D.	Total
Biological & Agricultural Sciences	12	2	16	2	1	19	52
Chemistry	14		3			3	20
Engineering	8		3			4	15
Mathematics & Statistics			1			1	2
Physical Sciences	4		2			4	10
Other	2	1	1	1			5
TOTAL	40	3	26	3	1	31	104

Pacific Northwest Environmental Research Laboratory

Director: Dr. Norbert A. Jaworski

The Pacific Northwest Environmental Research Laboratory is a multi-purpose facility responsible for research in four major areas:

--Coastal Pollution Branch

--Eutrophication and Lake Restoration

--Eutrophication Survey

--Thermal Pollution

PNERL also has a centralized Laboratory Services Branch which provides analytical and computer services in the Laboratory's other research programs.

Pacific Northwest Environmental Research Laboratory

Coastal Pollution Branch

Chief: Dr. Donald J. Baumgartner

Mission

Research on the behavior and effects of pollutants in the marine environment is the primary mission of the PNERL's Coastal Pollution Branch. Major research areas are related to:

--Effluent criteria for ocean outfalls.

--Marine water quality effects caused by ocean outfall discharges nonpoint sources.

--Assessment of ecosystem alterations caused by pollutants.

--Predictive techniques and models for pollutant dynamics and resulting ecosystem alterations.

--Water pollution problems especially related to marine coastal areas of the Pacific and Arctic Oceans.

Needs and Supporting Legislation

--Public Law 92-500, the "Federal Water Pollution Control Act Amendments of 1972."

--Public Law 92-532, the "Marine Protection Research and Sanctuaries Act of 1972."

FY-75 Resources

ROAP 21AIS -- Ocean Disposal Criteria

Allowance Category	Funding (K)	% of Total	Man-Years
Inhouse	178	30	5.5
Grants	395	66	--
Contracts	25	4	--
TOTAL	598	100	5.5

ROAP 21BEI -- Ecological Alteration Assessment

Allowance Category	Funding (K)	% of Total	Man-Years
Inhouse	108	72	3.5
Grant	42	28	--
Contract	0	0	--
TOTAL	150	100	3.5

ROAP 21AIT -- Modeling

Allowance Category	Funding (K)	% of Total	Man-Years
Inhouse	197	65	3.0
Grant	100	33	--
Contract	5	2	--
TOTAL	302	100	3.0

Technical Assistance

Allowance Category	Funding (K)	% of Total	Man-Years
Inhouse	110	100	3.0

P.E. Totals

Allowance Category	Funding (K)	% of Total	Man-Years
Inhouse	593	51	15.0
Grants	537	46	--
Contracts	30	3	--
TOTAL	1,160	100	15.0

Primary Program Thrust for FY-75

--The development and establishment of scientific criteria for ocean dumping and discharge of waste effluents through ocean outfalls. These criteria are those necessary to preclude detectable detrimental impact on the marine biota and on any of man's use of the marine resource.

--The development of monitoring concepts for ocean dumping and outfall discharges to coastal waters to insure compliance with the established criteria and regulations. Primary attention is directed to development of quantitative methods for assessing alteration to benthic communities.

--The development and testing of predictive models and mechanisms which quantitatively describe the physical, chemical, and ecological interactions between polluting substances and environmental factors of marine ecosystems.

These models and mechanisms will describe and predict the polluting source, the routes and rates of movement, storage points, rates of accumulation, transformation rates, as well as climatologically- and geographically-affected ecological interactions. Polluting substances include organic compounds, inorganic species such as heavy metals, and pathogenic organisms.

Polluting sources include: (1) municipal and industrial wastes; (2) dredge spoils and other solids; (3) atmospheric gasses, aerosols, and particles; (4) accidental spills; and (5) terrestrial drainage.

Major Accomplishments

--Demonstration of the widespread distribution of taconite tailings in Lake Superior as a result of Reserve Mining Company discharge. Reports prepared as testimony in the Federal court case.

--Development of a procedure for following kraft mill effluents in marine waters based on fluorescence procedures (7/71).

--Development of an aerial technique for the analysis of outfall discharges.

--Preparation of sections of the EPA Ocean Dumping Analytical Methods Manual. Sections prepared wholly or in part by this Program include:

a. Chemical methods.
b. Bioassay procedures.
c. Particle size analyses.
d. Marine macrobenthos; methods for sampling and analysis
e. Sampling methods for trace metal-trace organics analyses of marine waters and sediments.

--Development of a computer model to predict dilution and height of rise of buoyant wastes discharged to quiescent marine waters (9/71).

--Development of a mathmatical simulation model for predicting the physical fate of barged liquid and particulate wastes (10/73).

--Development of a two-layer coastal circulation model for the New York Bight Area, including coverage of both inner and outer harbor areas.

--Completion of baseline study at proposed Marine Sanctuary in the New York Bight. Progress reports describe the quantitative characterization of the biota of the site which represent a "healthy" benthic community and a good indicator for monitoring and assessing the effect of dumping. Physical data, i.e., currents, salinity, temperatures, etc., will be covered in subsequent reports.

Program Trends

Program objectives changed slightly in FY-75, with an increased emphasis on pipeline discharges, marine phytoplankton dynamics, and oil pollution. New work will be initiated to determine the best use of biomathematical indices of community structure and population dynamics as criteria for determining the "health" of marine ecosystems.

Coastal circulation mathematical models will be refined and applied to new geographical areas such as the north coast of Alaska.

The barge discharge simulation model evaluation will be completed in the field for some methods of sludge discharge. Desk top evaluations of dredge spoil dicharge will be compiled by joint interagency efforts with Corps of Engineers programs.

Criteria related work will include a continued effort to determine the chemical behavior of sludge, biotic uptake rates of heavy metals and other trace compounds; ionic and organic interactions; general behavior of heavy metals in coastal ecosystems; and the movement and accumulation of chlorinated hydrocarbons with ecological significance in Puget Sound, and in the Los Angeles and New York Bights.

A good start on describing the dynamics of fjords -- circulation and flushing times -- will have been made. This work is presently being performed with Puget Sound as the verification base, but the results will be applicable to Alaskan and New England fjords as well. Concurrently, the dynamics of ecosystems are being investigated with a view as to what factors control or initiate plankton blooms.

Professional Staff

Discipline	B.S.	B.A.	M.S.	Ph.D.	Total
Biological Sciences	1	1		1	3
Chemistry	1				1
Engineering	1		1	1	3
Physical Sciences	2		1		3
TOTAL	5	1	2	2	10

Pacific Northwest Environmental Research Laboratory

Eutrophication Survey Branch
Chief: Dr. Jack H. Gakstatter

Mission

When the Survey was established in early 1972, the mission was to determine the location, severity and extent of eutrophication in the nation's lakes and impoundments which act as receiving waters for waste water treatment plant effluents and to assist states and municipalities in implementing effective controls for phosphate-induced eutrophication where such controls have not already been instituted.

However, the passage of the 1972 Federal Water Pollution Control Act Amendments during October 1972 dramatically altered the complexion of the Survey's critical premises.

Of greatest importance, states were given responsibility under Sec. 106 reports, Sec. 303(e) basin plans, and Sec. 314(a) lake restoration to classify lakes, identify eutrophic lakes, define the causes and nature of lake pollution and develop procedures for eutrophication control.

This newly designated state responsibility usurped the singular responsibility of the Survey and its related program to perform these functions.

For this reason, the goals and objectives of the Survey were rewritten during December, 1972, to be directly supportive of the newly amended Water Bill.

The objective of the Survey then became development of knowledge on nutrient sources, concentration, and threat to selected fresh-water lakes as a basis for recommendations leading to comprehensive national, regional, and state management practices relating to nutrient controls from point and non-point sources.

Needs and Supporting Legislation

Supporting legislation for the program is primarily Sec. 104(a)(3) "conduct in cooperation with State Water Pollution Control Agencies and other interested agencies, organizations and persons, public investigations concerning the pollution of any navigable waters, and report on the results of such investigations."

Survey data will be useful in satisfying needs of State Water Pollution Agencies and EPA in several areas specifically designated in the Water Bill; Sec. 106 reports, Sec. 202(3) basin plans, Sec. 208 non-point source control plans, Sec. 303(c)(e) basin plans and water quality standards revisions, Sec. 305(b) non-point source assessment, and Sec. 314(a) lake classification.

FY-75 Resources (PNERL Activities)*

ROAP 25AJX - Nutrient Loading

Allowance Category	Funding (K)	% of Total	Man-Years
Inhouse	511	69	15.8
Tech. Assistance	17	29	--
Inter. Agency Agreement	218	2	--
TOTAL	746	100	15.8

ROAP 25AKM - Limiting Nutrient

Allowance Category	Funding (K)	% of Total	Man-Years
Inhouse	107	100	5.7
Totals	107	100	5.7

ROAP 25ALP - Land Use

Allowance Category	Funding (K)	% of Total	Man-Years
Inhouse	50	100	1.5
TOTALS	50	100	1.5

(continued on following page)

TOTALS			
Inhouse	685	76	23
Inter. Agreement	218	24	--
TOTAL	903	100	23

*Total Las Vegas FY-75 Budget $950K

Primary Program Thrust in FY-75

--Data evaluation and reporting -- major emphasis was put on evaluating and incorporating into reports, data from all surveyed lakes and reservoirs east of the Mississippi River.

--Initiating new sampling programs -- tributary and muncipal STP effluent sampling were started in all of the remaining western states (19). Lake sampling by NERC-Las Vegas was concluded in the mid-west states and began in the far-west states.

--Sample analysis -- several thousand tributary and STP effluent samples were analyzed for nitrogen and phosphorus content.

Major Accomplishments

--313 preliminary lake reports were completed and distributed to the appropriate states and EPA regional offices for review.

--179 final lake reports were completed and distributed to the appropriate state and regional offices.

--Working papers addressing the subjects of nutrients in municipal waste effluents, nutrient loading-concentration vs. lake trophic response, a trophic index system, and land use-nutrient relationships were completed and distributed.

--One chapter of the 305(b) report to Congress summarizing National Eutrophication Survey activities and results was prepared.

--Tributary and municipal STP sampling programs were started in 19 western states. This completed the initiation of sampling in all 48 contiguous United States.

--Quarterly data sets were sent to all state activities involved in the program during the year.

--12,200 stream samples and 2,700 municipal waste effluent samples were analyzed for nitrogen and phosphorus content.

Program Trends

All field sampling programs are in progress and will be completed by the end of CY 1975. The major trend of the program from now (July, 1975) to the scheduled end of the survey (December, 1976) will be on data evaluation and reporting. This will include the preparation of about 340 preliminary lake reports for the western states and general data analysis particularly in the areas of nutrient load-trophic response relationships and the relationships of drainage area characteristics, e.g., land use, to nutrient levels in surface waters.

Professional Staff

Discipline	B.S.	M.S.	Ph.D.	Total
Biological Sciences	5	3	1	9
Chemistry	4		1	5
Physical Sciences	1			1
TOTAL	10	3	2	15

Pacific Northwest Environmental Research Laboratory

Eutrophication and Lake Restoration Branch

Chief: Thomas E. Maloney

Mission

The Eutrophication and Lake Restoration Branch is responsible for the development, direction, coordination and review of research and development programs on a National scale to provide for the control of accelerated eutrophication and methodology for lake restoration. Its primary objectives are to:

--Develop an understanding of the eutrophication process.

--Develop methods for monitoring eutrophication conditions and for predicting the impact of nutrient sources on eutrophication.

--Develop technology to control and reverse eutrophication processes.

--Establish the practicability of using this technology through pilot and demonstration scale application.

The Branch also provides consultation and technical assistance to other research programs and regulatory sections of EPA; other Federal agencies; state and municipal governments; and to universities, private firms and industries.

Supporting Legislation

The supporting legislation for the intra-extramural research are Sections 104(a); 106, Appendix A; and 314(a) of the Federal Water Pollution Control Act Amendments of 1972 (PL 92-500).

FY-75 Resources

ROAP 21AIY - The Determination of Lake Restoration Procedures

Allowance Category	Funding (K)	% of Total	Man-Years
Inhouse	540	62	13.5
Grant	291	34	--
Interagency Agreement	33	4	--
TOTALS	864	100	13.5

Implementation

E&LRB will evaluate effectiveness of various manipulations as lake restoration procedures. These include research and demonstrations on point source nutrient removal, nutrient diversion, nutrient inactivation, and aeration and weed harvest.

ROAP 21AJA - Predictive Models for the Eutrophication Process

Allowance Category	Funding (K)	% of Total	Man-Years
Inhouse	142	82	0.1
Contract	0	0	--
Grant	30	18	--
TOTALS	172	100	0.1

Implementation

Emphasis has been placed on development of an adequate, readily accessible data file for Shagawa Lake and upon development of mathematical models to simulate biological (particularly algal) activity in the lake and to simulate recovery of the lake.

ROAP 21AJE - Development of Techniques to Measure Nutrients from Diffuse Sources

Allowance Category	Funding (K)	% of Total	Man-Years
Inhouse	20	24	0.7
Grant	64	76	--
TOTALS	84	100	0.7

Implementation

Emphasis is on the development of laboratory and/or field methods for quantitatively describing the nutrient contribution from diffuse sources.

ROAP 21AJF - Development of Methods for Assessing and Categorizing the Potential Eutrophication of Natural Waters.

Allowance Category	Funding (K)	% of Total	Man-Years
Inhouse	154	92	4.8
Grants	14	8	--
TOTALS	168	100	4.8

Implementation

Emphasis is on the development, evaluation and promulgation of laboratory and field techniques for measuring, predicting and categorizing the response of aquatic ecosystems to specific additions or reductions of nutrients.

ROAP 21AIZ - Management Alternatives for Eutrophic Ecosystems when Nutrients Cannot be Controlled

Allowance Category	Funding (K)	% of Total	Man-Years
Inhouse	50	50	3.0
Grants	50	50	--
TOTALS	100	100	3.0

TOTALS

Inhouse	906	65	22
Grant	449	32	--
Contract	0	0	--
Interagency Agreement	33	3	--
TOTAL	1,388	100	22

Implementation

Literature surveys, laboratory studies, and field tests are conducted to develop and evaluate management techniques for eutrophic systems. Emphasis is on biological control and biomanipulation to effectively utilize the increased productivity of eutrophic situations.

Major Accomplishments

--Developed provisional algal assay procedure (2/69).

--Conducted eutrophication - biostimulation assessment workshop (6/69).

--Conducted workshop on modeling the eutrophication process (10/69).

--Evaluated impact of nitrilotriacetic acid (NTA) on the eutrophication process (10/70).

--Completed evaluation of phosphorus removal pilot plant at Ely, Minnesota (10/70).

--Established significance of phosphorus in the eutrophication process (2/71).

--Evaluated aeration as a lake restoration procedure (5/71).

--Developed cooperative project with U.S. Forest Service to restore Diamond Lake, Oregon (5/71).

--Completed design of advanced waste treatment plant at Ely, Minnesota (6/71).

--Completed standardization of algal assay procedure for studying eutrophication problems (8/71).

--Completed evaluation of induced soil percolation to remove nutrients from wastewater (5/72).

--Completed evaluation of weed harvesting as a lake restoration technique (12/72).

--Completed evaluation of potential effects of campground wastes on ultra-oligotrophic Waldo Lake, Oregon (2/73).

--Prepared report to Administration, Region X, on the predicted effect of elimination of smelter wastes upon the growth of algae in the Spokane River Basin (2/73).

--Reviewed revised phosphorus control goals and criteria for Region V (3/73).

--Full-scale advanced waste treatment plant at Ely, Minnesota became operational (4/73).

--Completed preliminary mathematical model for Shagawa Lake, Minnesota, (8/73).

--Conducted workshop on modeling the eutrophication process (9/73).

--Completed reduction of limnological and nutrient budget data on Shagawa Lake, Minnesota, prior to point source phosphorus removal (12/73).

--Completed a final report summarizing the state-of-the-art of all lake restoration methods (12/74).

--Completed laboratory studies of nutrient inactivation as a lake restoration procedure (Oct. 1974).

--Completed studies of sediments and sediment-water nutrient interchange in Upper Klamath Lake, Oregon (Aug. 1974).

--Conducted workshop on biological control of eutrophication (March 1975).

--Completed first phase of extensive literature survey of biological control and aquatic harvesting.

--Completed extramural study of eutrophication of Lake Tahoe (Dec. 1974).

--Completed report on Waldo Lake, Oregon, for North American Project, OECD.

--Completed first year's pilot field study of nutrient inactvation using zirconium.

--Completed pilot field study of nutrient inactivation using sodium aluminate.

--Completed review of "Aquatic Sediments" for JWPCF annual literature review.

--Rendered technical assistance to Regions I and V in litigation on Lakes Champlain and Superior.

Program Trends

In the next two to five years, the following accomplishments are planned for:

--Evaluation of the effects of the advanced waste treatment (phosphorus removal) plant at Ely, Minnesota, upon the recovery of Shagawa Lake will be completed.

--Evaluation of alum, a nutrient inactivant, to restore Twin Lakes, Ohio, will be completed.

--Evaluation of nutrient diversion as a method to restore Lake Sallie, Minnesota, will be completed.

--The present mathematical model for Shagawa Lake will be expanded and revised and the results applied to other lake systems.

--The capability for prediction of time course for the restoration of lakes will be refined.

--Evaluate and define the role of sediments in supplying phosphorus to overlying water under various chemical and physical conditions.

--Sediment-water nutrient interchange models will be developed.

--Testing and evaluation of model development aimed at an increased understanding of lake metabolism and the effects of manipulation will be continued.

--Complete final report on lake drawdown as a lake restoration technique.

--Complete final report on the use of fly ash, a nutrient inactivant to restore Lake Charles, East Indiana.

--A final report on the laboratory evaluation of nutrient inactivation will be completed.

--Reports on the field testing of several of the most promising nutrient inactivants will be completed. These will include the effectiveness and practicability of specific inactivants as well as methodology for operational use.

--Management alternatives for eutrophic ecosystems where nutrients cannot be controlled will be developed.

--The effect of nutrient interception and diversion on Diamond Lake, Oregon, will be evaluated.

--It will be demonstrated how algal assays can be used to aid enactment of realistic critical nutrient criteria in river systems.

--Interaction of industrial, agricultural and domestic waste effluents upon the growth of plankton algae in a multiple use river system will be evaluated.

--Development and laboratory and field evaluation of a marine assay procedure to study eutrophication problems will be completed.

--The practical utilization of the algal assay procedure in predicting the enrichment or inhibitory characteristics of wastewater from nonpoint sources will be evaluated.

Professional Staff

Discipline	B.S.	M.S.	M.A.	Ph.D.	Total
Biological Sciences	3	4	2	3	12
Chemistry	2	1			3
Engineering		1			1
Mathematical Sciences		1			1
TOTAL	5	7	2	3	17

Pacific Northwest Environmental Research Laboratory

Thermal Pollution Branch
Chief: Frank H. Rainwater

Mission

The mission of PNERL's Thermal Pollution Research Program is to provide the scientific-engineering-economic base for control of thermal pollution.

Need and Supporting Legislation

Section 104(t) directs the Administrator to "....conduct continuing comprehensive studies of the effects and methods of control of thermal discharges...available technology, economic feasibility...total impact on environment considering...water quality, air quality, land use, and effective utilization and conservation of freshwater and other natural resources...minimizing adverse effects and maximizing beneficial effects..."

Section 303D requires a determination of max daily thermal load for waters for which compliance with effluent standards will not meet water quality standards. This necessitates improvements in sophistication of heat budget treatment.

Section 316(a) provides for case-by-case exemption to effluent standards for heat if it can be demonstrated that such standards are more stringent than necessary to protect biota. This requires hydraulic and heat budget modeling.

Section 316(b) requires that location, design, construction, and capacity of cooling water intake structures reflect best technology available for minimizing environmental impact.

FY-75 Resources

ROAP 21AJH - Thermal Pollution Research

Allowance Category	Funding (K)	% of Total	Man-Years
Technical Assistance	27	11	--
Inhouse	106	46	4
Grants	65	28	--
Contracts	35	15	--
TOTAL	233	100	4

ROAP EHB540 - Energy Research

Allowance Category	Funding (K)	% of Total	Man-Year
Grants & Contracts	275	100	0
TOTAL	275	100	0

TOTALS .

Inhouse & Technical Assistance	133	26	4
Grants & Contracts (Extramural)	375	74	--
TOTAL	508	100	4

Primary Program Thrust FY-75

Primary program thrust in FY-75 included:

--Analytical-lab development of fluid dynamic models for predicting thermal plume behavior, culminating in reports:

(1) Workbook on Thermal Plume Prediction, Volume II, Surface Discharges (completed July, 1974).

(2) Three workshops on thermal plume prediction. (New York, Nov. 25-26, 1974).

(3) Critical Analysis of Temperature Prediction Models for Large Hydrologic Systems (Grant - completed).

--Development of cooling tower vapor plume models, with emphasis on field verification. Involved in-house project (i.e., field study) at Commanche Power Plant, Pueblo, Colorado (Completed) and grant to U. of Colorado (continuing).

--Satisfy Section 303(d) need through contract to improve statistical reliability of stream temperature prediction (completed June, 1974).

--Start fluid dynamic research on cooling water intake design and operation for Section 316(a) (continuing).

Accomplishments

--Provided scientific and engineering expertise in waste heat management to regulatory arms of EPA and state environmental agencies needed in support of adversary proceedings and promulgation of water quality and effluent standards. Continuing.

--Developed and perfected predictive models for thermal behavior in freshwater and marine environment. Submerged discharges July, 1972; surface discharges March, 1974.

--Assessed the potentials for beneficial uses of waste heat (September, 1970) and (under PE 1BB392) demonstrated agricultural uses including frost protection, row and spray irrigation, subsoil heating, and greenhouse horticulture (August, 1973).

--Developed guidelines for biological surveys at proposed heat discharge sites (April, 1970).

Program Trends

--Quantify secondary environmental effects of cooling systems (continue coordination with RTP on meteorology and NERL on drift).

--Report(s) on water use alternatives in coal conversion facilities (continue coordination with Region VIII, NGPRP).

--Field verify predictive plume models and assess water quality impacts of alternative large scale heat control systems (Section 316(a) data).

--Impact ecological modeling in math, statistics, and fluid dynamics (NWQL and NMWQL).

--Support Toxic and Hazardous Materials program and OEGC in litigation involving water quality and effluent criteria.

--Periodic submission of reports to the Congress required by Section 104(t).

--Energy needs and effort still uncertain.

--Provide support to Office of Energy Programs on developing research plans.

Professional Staff

Discipline	B.S.	M.S.	Ph.D.	Total
Engineering			3	3
Physical Sciences	1	1		2
Total	1	1	3	5

Pacific Northwest Environmental Research Laboratory

Laboratory Services Branch
Chief: Daniel F. Krawczyk

Mission

Service and consultation on analytical matters is the mission of the Laboratory Services Branch. Routine chemical analyses, special chemical analyses, participation in research projects, computer assistance, electronic repair and modification, and routine glassware repair, are the areas of service within the realm of LSB.

Analytical chemists, computer programmers, and electronic technicians have highly specialized skills. Each of the programs at PNERL requries services of these types, however, only on an intermittent basis. Therefore, this type of expertise has been "pooled" in the LSB where proficiency and efficiency are maintained by performing the required analyses for all programs on a regular basis.

Pooling of these resources into a manageable unit is an alternative to each program operating independently. This type of approach, although used infrequently in governmental operations, is not new in the "Industrial World."

Methodology used by the Laboratory Services Branch is that which has been documented in the literature. Our purpose is not research in methodology, but the use of accepted and modified techniques in support of research needs.

Resources and Program Implementation

The Laboratory Services Branch has eight professional and four technical permanent positions as well as one clerical permanent position. The work force also includes a variable level of work study, stay in school, and temporary employees. The work load generated by the various research programs governs the number of non-permanent employees.

There are 40 people working in the Laboratory Services Branch at this time; this is equivalent to 21.5 man weeks of effort per week. The budgets for the last three fiscal years was as follows: FY-73, 406K; FY-74, 381K; FY-75, 398K. In Table 1 is a summary of volume and cost for chemical analyses.

One of the tools for managing, tracking and scheduling samples and reporting data is the SHAVES system. SHAVES is a sampling-handling and verification system that combines routine chemical, microbiological, and biological analysis with a programmed computer operation to achieve a businesslike approach in laboratory management.

The computer is used as a tool to produce bench sheets, to catalog data, to provide data summaries, weekly production information, schedules, and backlog information. The SHAVES program enables the laboratory manager to monitor production and costs. SHAVES is very flexible and rarely goes more than a month without some change to improve some phase of operation. The more routine the operation becomes, the more valuable SHAVES is as a tool.

Major Accomplishments

Corvallis analyzed approximately 24,400 samples from all sources conducting approximately 140,000 analyses during fiscal year 1975.

The use of production line techniques has brought down the average cost of an average analysis from $5.93 per test in FY-72 to $2.87 per test in FY-75.

The computer section provides service to other programs and, excepting the development of SHAVES for the Laboratory Services Branch, its accomplishments are achievements in behalf of others. The computer section has:

--Generated data reduction and reporting systems for algal assays.

--Participated in building models of thermal pollution, along with extensive plot programs for their output; participated similarly with models for coastal pollution.

--Assisted the administrative programs of the NERC in operating or developing administrative support systems in areas of financial management, property and personnel.

--Represented NERC-Corvallis on agency-wide task forces.

--Performed countless data reduction tasks for the staff of NERC-Corvallis.

A major accomplishment as reported in a Program Highlights Newsletter is the "Automated, Computer-Controlled, Chemical Analytical System." This unique scheduling system including data capture and monitoring of AQC information has been provided for the automated section of LSB by the computer section.

Professional Staff

Discipline	Ph.D.	B.S.	M.S.	Total
Chemistry	2	4	1	7
Other		2	1	3
Total	2	6	2	10

Fiscal Year Summary of Sample-Test Volume and Cost of Chemical Analysis

Program	Year	Samples	Tests	Cost*
CPB	1972	690	1,039	11,800
	1973	556	2,100	-1,200
	1974	186	1,359	5,400
	1975	128	773	14,700
E&LRB	1972	3,557	29,669	100,600
	1973	1,777	12,199	45,700
	1974	3,546	24,493	52,200
	1975	2,792	19,617	40,500
IWB	1972	1,635	5,493	40,800
	1973	949	2,984	18,700
	1974	349	1,046	13,600
	1975	81	174	7,700
ESB	1972	70	267	
	1973	14,966	101,445	220,000
	1974	27,650	187,284	204,800
	1975	17,571	96,295	249,500
NERL	1973	21	162	
	1974	758	1,324	6,200
	1975	3,048	5,426	16,200

*Excluding Computer, Electronics and Biology in 72 and 73.

Western Fish Toxicology Station

Chief: Dr. Ronald R. Garton

Mission

The Western Fish Toxicology Station generates water quality criteria data, through research, to establish water quality standards for the protection of aquatic life.

WFTS also provides technical assistance to Federal and state agencies for the interpretation and inclusion of these data into appropriate water quality standards for the protection of water use.

Supporting Legislation

Need for research on the effects of pollutants and environmental requirements of freshwater fish, other freshwater life and wildlife are reflected in PL 92-500:

--"It is the national goal that whenever attainable, an interim goal of water quality which provides for the protection and propagation of fish, shellfish, and wildlife and provides for recreation in and on the water be achieved by July 1, 1983"; (Section 101(a)(2)).

--"It is the national policy that the discharge of toxic pollutants in toxic amounts be prohibited" (Section 101(a)(3)).

PL 92-500 states the following responsibilities of the Administrator:

--...In the development of such comprehensive programs due regard shall be given to the improvements which are necessary to conserve such waters for the protection and propagation of fish and aquatic life and wildlife, recreational purposes, and the withdrawal of such waters for public water supply, agricultural, industrial and other purposes (Section 102(a)).

--Establish national programs for the prevention, reduction, and elimination of pollution (1)...including studies relating to the causes, effects and extent...of pollution (Section 102(2)(1)).

--Provide improved methods and procedures to identify and measure the effects of pollutants (Section 104(d)(2)).

--Develop...the...scientific knowledge...indicating the kind and effects... expected from the presence of pesticides in the water in varying quantities (Section 104(1)(1)).

--...Conduct...studies of the effects and methods of control of thermal discharges (Section 104(t)).

--Shall publish a proposed effluent standard for such pollutant or combination of pollutants which shall take into account the toxicity of the pollutant...(Section 307(a)(2)).

The need for providing research findings and technical assistance to Federal and state agencies is also outlined in PL 92-500. It states that the Administrator shall:

--Collect and disseminate...basic data on chemical, physical, and biological effects of varying water quality...(Section 104(b)(6)).

--At least once every three years states shall hold public hearings to review and modify water quality standards (Section 303(c)(1)).

--Such standards shall be established taking into consideration their use and value for public water supplies, propagation of fish and wildlife, recreational, agricultural, industrial and other purposes... (Section 303(c)(1)).

--Shall develop...and from time to time thereafter revise criteria for water quality accurately reflecting the latest scientific knowledge (Section 304(2)(1)).

--Shall develop...information on the factors necessary for the protection and propagation of shellfish, fish, and wildlife for classes and categories of receiving water...(Section 304(a)(2)(B)).

FY-75 Resources

Allowance Category	Funding (K)	% of Total	Man-Years
Heavy Metals Criteria			
Inhouse	142	38	4
Grants	64	17	--
Supersaturation Criteria			
Inhouse	126	33	4
Bioassay Methods			
Inhouse	16	4	0.5
Technical Assistance	31	8	1
TOTAL	379	100	9.5

(continued on following page)

TOTALS

Inhouse	315	83	9.5
Grants	64	17	--
TOTAL	379	100	9.5

Major Accomplishments

--Developed laboratory facilities and techniques for conducting bioassays with adult juvenile Pacific salmon.

--Through use of bioassays, determined tolerances of various life stages of five species of Pacific Northwest salmonids to copper, cadmium, and zinc.

--Through use of bioassays, determined tolerances of various life stages of six species of Pacific Northwest salmonids and several species of non-salmonids to gas supersaturation of water.

-Developed summary document on supersaturation effects for U.S. Army Corps of Engineers for help in deciding best course of action in solving the supersaturation problems on the Columbia and Snake Rivers.

--Through comparative bioassays, determined effects of selected bioassay method variables on results of toxicity studies.

--Provided technical assistance to State of Oregon hatcheries in solving problems due to heavy metals contamination and supersaturated water supplies.

Program Trends

--Develop additional test methods for working with important Pacific Northwest species. Such species include competitors, predators or food organisms of salmonids and other important anadromous species such as striped bass.

--Expand the heavy metals work to include investigations on effect of forms of metals on toxicity.

--Continue heavy metals work in field or artificial stream studies to determine metal forms in a "natural" situation and provide correlation with toxicity of the metals.

--Supersaturation research is expected to be completed during CY-76. In the mean time, tests will be completed to determine effect of supersaturation on saltwater acclimation, effect of gas composition on gas bubble disease, and effect of depth compensation upon fishes exposed to supersaturation.

--Technical assistance requests have increased during the past three years and it is anticipated that approximately 10% of staff time will be spent on such tasks.

Professional Staff

Discipline	A.A.	B.S.	M.S.	Ph.D.	Total
Biological Sciences		1		5*	6
Chemistry		1			1
Engineering		1			1
General Mechanic					1
Administrative Tech.	1				1
TOTAL	1	3		5	10

*One of these positions occupied for only 6 months, thus giving 9.5 MY of effort for FY-75.

Arctic Environmental Research Laboratory

Director: Richard W. Latimer

Mission

The Laboratory has the responsibility for providing the data necessary for environmental protection in cold climate areas. This includes (a) conducting research on the interrelationships between cold dominated environments and their indigenous organisms and conducting studies relating to effects of man-induced factors on arctic and subarctic ecosystems; and (b) conducting research including development and demonstration of technology, necessary for the control of environmental pollution in cold climate.

Need and Supporting Legislation

The Laboratory was one of seven authorized by Congress in the Federal Water Pollution Control Act Amendments of 1961 (P.L. 87-88) and reauthorized as Sec. 104(e) (P.L. 92-500) in 1972. The legislation recognizes that there are unique problems associated with environmental protection in cold climate areas that can best be solved through a laboratory program in Alaska.

Sec. 113 (P.L. 92-500) authorized the "Alaska Village Demonstration Projects" to "demonstrate methods to provide for central community facilities for safe water and elimination or control of pollution in those native villages of Alaska without such facilities." These projects require a wide range of environmental health considerations and provide the basis for technology research application in Alaska.

The generally pristine environments in Alaska and the technological inovations necessary to protect these environments while developing needed resources makes it imperative that the Agency maintain a viable research program in Alaska.

Capabilities and Program Implementation

AERL has strong expertise in freshwater aquatic ecology and environmental engineering in cold climates. Research is implemented by a blend of intramural and extramural resources.

FY—75 Resources

ROAP 21ARX - Environmental Impact of Man Induced Factors on Arctic and Subarctic Systems.

Allowance Category	Funding (K)	% of Total	Man-Years
Inhouse	208	71	4.5
Grant	75	26	--
Contract	8	3	--
TOTAL	291	100	4.5

ROAP 21ASA - Effect of Oil on Arctic Freshwater Systems

Allowance Category	Funding (K)	% of Total	Man-Years
Inhouse	11	35	0.3
Grant	20	65	--
TOTAL	31	100	0.3

ROAP 21ARY - Man Induced Factors on Arctic Marine Systems

Allowance Category	Funding (K)	% of Total	Man-Years
Inhouse	25	100	0.2
TOTAL	25	100	0.2

ROAP 21ARZ - Effects of Oil on Marine and Estuarine Environments

Allowance Category	Funding (K)	% of Total	Man-Years
Inhouse	20	100	0.5
TOTAL	20	100	0.5

ROAP 21ASF - Alaska Village Project

Allowance Category	Funding (K)	% of Total	Man-Years
Inhouse	310	29	7.0
Grant	0	3	--
Contract	676.9	64	--
Inter. Agency Agreement	39.8	4	--
TOTAL	1026.7	100	7.0

(continued on following page)

ROAP 21BLI - Ice Fog Prevention and Elimination

Allowance Category	Funding (K)	% of Total	Man-Years
Inhouse	30	60	1.5
Interagency Agree.	20	40	--
TOTAL	50*	100	1.5
ENERGY RESEARCH	480	100	0

P.E. Totals	Funding (K)	% of Total	Man-Years
Inhouse	604	31	14
Grant	95	5	--
Contract	684.9	36	--
Interagency Agreement	59.8	3	--
Energy	480	25	--
TOTAL	1923.7	100	14

*33K reimbursed by Region X

Major Accomplishments

--Development of design criteria for biological waste treatment processes under cold climate conditions.

--Identification of the phenomena of low winter dissolved oxygen in Alaskan rivers; its extent and environmental implications.

--Evaluation of wastewater disinfection at low temperatures utilizing chlorine and lime.

--Development of toxicity data for crude oil on some indigenous Alaskan organisms at low temperatures.

--Identification of automotive emissions produced at sub-zero temperatures from various types of fuels and emission control devices.

--Demonstration of ice fog control technology.

--Demonstration of the central facility concept for providing a safe water supply, toilets, bathing, laundry, and waste disposal for Alaskan native villages.

--Understanding the role of microorganisms in cold climate ecology including the survival of enteric bacteria in rivers under low temperature conditions.

--Demonstration of the effectiveness of automotive retrofit devices under cold climate conditions.

--Development of marine and freshwater baseline data in Alaska's developing North Slope Region.

Program Trends

The research program at the Arctic Environmental Research Laboratory has in the past been oriented towards meeting immediate waste treatment needs in Alaska and baseline data collection for an understanding of the unique arctic and subarctic ecosystems. The present program has emphasized fate and effect studies of various pollutants from man's activities in cold climates and applied state-of-the-art technology to meet environmental health problems in remote rural communities. Future research will be heavily oriented towards the environmental impact of resource development (oil, gas, lumber, metals, etc.) in the arctic and subarctic. Ecological research will have to move into the predictive mode in order to properly assess environmental impact before it occurs. Environmental engineering will continue to play an important role in applying technological advancement to cold climate areas.

Professional Staff

Discipline	B.S.	B.A.	M.S.	M.A.	Ph.D.	Total
Biological Sciences (Bacteriology, Aquatic Biology)		1	1		1	3
Chemistry (Analytical, Physical and Organic	2		1			3
Engineering (Sanitary, Chemical, Mechanical and Civil)	5					5
Physical Sciences (Soil Science)					1	1
Other (History, Education and Community Development)		1		1		2
Total	7	2	2	1	2	14

National Ecological Research Laboratory

Director: Dr. Norman R. Glass

The National Ecological Research Laboratory is responsible for a wide range of research on the effects of air, water, and terrestrial pollutants on total ecosystems. It is also EPA's primary laboratory for ecological studies in support of secondary air quality standards.

National Ecological Research Laboratory

Ecological Effects of Air Pollution
Project Leader: Dr. Lawrence C. Raniere

Mission

The mission of this program is to conduct, coordinate and monitor air pollution effects research needed to support scientific basis of national secondary air quality standards and control of other air pollutants. Effects of specific gaseous and particulate air pollutants on vegetation, animal, soils and whole ecosystems are investigated through:

Ambient field studies and surveys.

Controlled field studies.

Greenhouse screening.

Controlled growth chamber exposures.

Physiological and biochemical analysis.

Need and Supporting Legislation

Section 103(f)(1) of the Clean Air Act states that "The Administrator shall give special emphasis to research on the short- and long-term effects of air pollutants on public health and welfare."

Section 103(f)(1)(B) further adds that "He shall conduct an accelerated research program - to improve knowledge of the short- and long-term effects of air pollutants on welfare." "Welfare" is defined explicitly in the Clean Air Act Title III -- General, under Section 302(h) as "Including, but is not limited to, effect on soils, water, crops, vegetation, manmade materials, animals, wildlife, weather, visibility, and climate, damage to and deterioration of property and hazards to transportation, as well as effects on economic values and on personal comfort and well-being."

A systematic approach to assuring the adequacy of environmental standards requires assessment of specific and pollutant interaction effects on single biotic communities, as well as whole ecosystems population indices.

Capabilities and Program

This program has professional strength in whole systems research, biological sciences, and ambient (field) ecological studies.

Emphasis is placed upon inhouse activities in field, greenhouse and laboratory research dealing with parts of and whole bioenvironmental systems.

FY-75 Resources

ROAP 21ALR -- Secondary Air Quality Standards

Allowance Category	Funding (K)	% of Total	Man-Years
Inhouse	288	34	7
Grant	212	25	--
Interagency Agreement	190	22	--
Contract	155	19	--
TOTAL	845	100	7

ROAP 21ALU -- Predictive Modeling

Allowance Category	Funding (K)	% of Total	Man-Years
Inhouse	196	35	8
Grant	200	35	--
Interagency Agreement	20	3	--
Contract	153	27	--
TOTAL	569	100	8

ROAP 21ALS - Field Studies of Natural and Disturbed Ecosystems

Allowance Category	Funding (K)	% of Total	Man-Years
Inhouse	44	12	2
Grant	60	16	--
Interagency Agreement	30	8	--
Contract	246	64	--
TOTAL	380	100	2

(continued on following page)

ROAP 21BBK -- Ecological Effects of Air Pollution

Allowance Category	Funding (K)	% of Total	Man-Years
Inhouse	101	67	2
Grant	50	33	--
Interagency Agreement	0	0	--
Contract	0	0	--
TOTAL	151	100	2

Prog. Element Totals	Funding (K)	% of Total	Man-Years
Inhouse	629	32	19
Grant	522	27	--
Contract	554	29	--
Interagency Agreeement	240	12	--
TOTALS	1,945	100	19

Major Accomplishments

--Established the significance of air pollution effects on important agricultural crops (1955-1968).

--Developed data base and documentation on scientific basis for particulate matter secondary air quality standards (1/69).

--Developed data base and documentation on scientific basis for sulfur secondary air quality standards (3/69).

--Developed data base and documentation on scientific basis for hydrocarbons secondary air quality standards (3/70).

--Developed data base and documentation on scientific basis for photo-chemical oxidants secondary air quality standards (3/70).

--Developed data base and documentation on scientific basis for carbon monoxide secondary air quality standards (3/70).

--Developed data base and documentation on scientific basis for nitrogen oxides secondary air quality standards (1/71).

--Established National Ecological Research Laboratory (1/73).

--Contributed to revision of secondary air quality standard for sulfur oxides (9/73).

--Published more than 80 scientific papers on air pollution effects.

Program Trends

--Delineation of gaseous air pollutant interaction effects.

--Expansion of work in whole systems impact (soils, plant, animals) of gaseous and particulate pollutants.

--Improvement of knowledge on biological consequences, fate and transformation of common gaseous and fine particulate air pollutants.

--Quantification of national crop losses attributable to air pollution.

--Development of predictive models for determining long-term impacts of air pollutants on terrestrial ecosystems.

National Ecological Research Laboratory

Pesticide Effects on Terrestrial Environments
Project Leader: Dr. Allen S. Lefohn

Mission

The primary mission of this program is establishment of suitable data gathering protocols and assays to determine the ecological effects and transport of selected pesticide compounds in simulated plant/animal ecosystems and models.

Need and Supporting Legislation

Under FIFRA, as amended, the Environmental Protection Agency must provide testing protocols to the manufacturers of pesticides for the specific purpose of assessing the ecological impact of these chemicals on man and his environment.

Capabilities and Program Implementation

This program has experience and profession strength in microcosm design and operation and in biological sciences.

Emphasis is on the use of laboratory microcosms to simulate trophic levels in natural ecosystems.

FY-75 Resources

ROAP 21BCL - Pesticide Effects on Terrestrial Environments

Allowance Category	Funding (K)	% of Total	Man-Years
Inhouse	160	31	3*
Grant	318	63	--
Contract	0	0	--
Interagency Agreement	30	6	--
TOTAL	508	100	3*

*1 man-year at Gulf Breeze, Florida, Laboratory.

Major Accomplishments

As of March, 1975, the program has design and tested several microcosms.

Program Trends

--Development of standards simulation systems.

--Testing of a series of representative alternate pesticide compound types.

--Prediction of bioaccumulation in ecosystems components (soils, animals, and vegetation).

--Following transport of a stressant through a simulated ecosystem.

--Identification of by-products.

--Identification of degradation rates.

--Identification of where to look for effect anomalies.

National Ecological Research Laboratory

Ecological Effects of Energy-Producing Activities

Project Leader: Dr. Allen S. Lefohn

Mission

The primary goal of this program is to provide a scientific basis for minimizing the bioenvironmental impact associated with energy producing activities and developing a protocol for land use planners to assess impact prior to site selection. Initial thrust will focus on the assessment of air pollution effects of proposed coal fired power plant on: (1) energy flow; (2) nutrient cycling; (3) species composition and diversity; and (4) physiologic and behavioral response.

Need and Supporting Legislation

New legislation related to national energy production requires associated safeguards to assure that optimal decisions are made which take into account crucial environmental impacts. Work accomplished by NERL will document the bioenvironmental aspects of these decisions.

Capabilities and Program Implementation

This program has professional strength in whole systems research, biological sciences, and field ecological studies. Emphasis is placed upon inhouse conduct of field study at a proposed coal-fired power plant site in eastern Montana (Colstrip).

FY-75 Resources

ROAP 21BCI -- Ecological Effects of Fossil Fuel Power Plants (Energy)

Allowance Category	Funding (K)	% of Total	Man-Years
Inhouse	510	54	5
Grant	290	31	--
Interagency Agreement	150	15	--
Contract	0	0	--
TOTAL	950	100	5

Program Trends

--Incorporation and integration of physical sciences and biological data into predictive protocol for planners.

--Coordination with regional, state and local government and educational/research institutions.

--Plans for, and selection of, second field study site.

NERL Totals

Allowance Category	Funding (K)	% of Total	Man-Years
Inhouse	1299	38	27
Grants	1130	34	--
Contracts	554	16	--
Interagency Agreement	420	12	--
TOTALS	3403	100	27

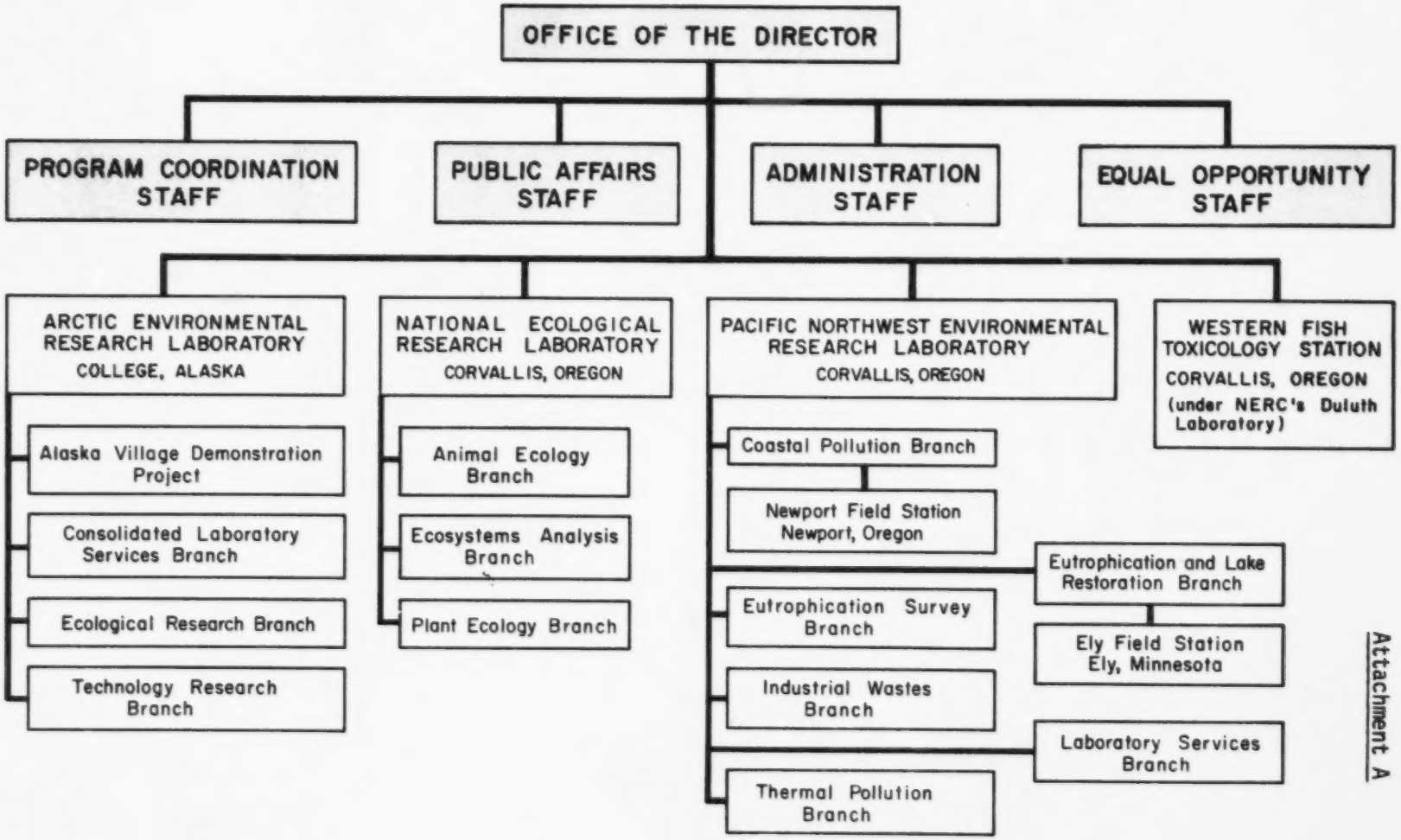
National Ecological Research Laboratory
Professional Staff*

Discipline	B.S.	M.S.	Ph.D.
Ecologist		1	4**
Biologist	2	7	4
Mathematics/ Statistics			1
Physical Scientist			3
Engineering	1	1	
TOTAL	3	9	12

*Permanent professional staff members. Temporary and IPA appointments include 2 additional Ph.D.'s and 1 M.S. Ecologist; 3 Ph.D., 1 M.S. and 1 B.S. Biologist; and 1 Ph.D. Mathematician for a total of 33 professional staff members.

**One D.V.M.

COMPONENTS OF THE CORVALLIS ENVIRONMENTAL RESEARCH LABORATORY AS THEY EXISTED UNDER NERC-CORVALLIS



Attachment A

Attachment B

BIOGRAPHICAL SKETCHES OF KEY STAFF MEMBERS
(in alphabetical order by last names)

ALLUM, Marvin O. -- Chief, Data Interpretation Section, Eutrophication Survey Branch.

Experience

-- Has held present position since 1972, coordinating the collection of of physical, chemical, and biological data on more than 800 lakes in the United States, their tributaries, and municipal and industrial wastewater treatment plants impacting the lakes. He is responsible for interpretation and statistical validity of the data, and has major responsibility for preparation of reports on each lake. Reports include assessment of trophic condition, point-source nutrient impacts, and recommendations for lake restoration procedures, if needed.

-- 1967 to 1972, Supervisor of Water Quality Surveillance, State Department of Health, Pierre, S.D., where he was responsible for collection, analyses, tabulation, interpretation, STORET input and output, and reporting of water quality data from 30 water quality stations in the state.

-- 1966 to 1967, Water Quality Standards Coordinator, Federal Water Pollution Control Administration, Northwest Regional Office, Portland, Or.

-- 1963 to 1966, Aquatic Biologist, Northwest Regional Office of the Federal Water Pollution Control Administration.

-- 1956 to 1963, Assistant Professor and Assistant Zoologist at the Entomology-Zoology Department's Experiment Station, South Dakota State University.

-- 1953 to 1956, Aquatic Biologist, Division of Sanitary Engineering, South Dakota Department of Health.

-- 1950 to 1952, Assistant Fisheries Biologist, Fisheries Division, South Dakota Department of Game, Fish & Parks.

Education

B.S. in wildlife conservation, South Dakota State University; M.S. in zoology, University of Michigan; fisheries science studies in doctoral program at University of Michigan.

ALLUM (con't)

Professional Affiliations

American Fisheries Society, American Society of Limnology and Oceanography, Great Plains Fisheries Workers Association, Water Pollution Control Federation, American Institute of Fishery Research Biologists, Phi Kappa Phi, Sigma Xi, Gamma Sigma Delta, and Alpha Zeta.

BARTSCH, Dr. A. F. -- Acting Director, CERL.

Experience

-- 1971 to 1975, Director, National Environmental Research Center, Corvallis, where he directed the programs of nine major associated laboratories and six field stations located in 10 different states. The complex, with an annual budget of more than $34 million and some 700 employees, was responsible for a wide range of ecological effects research and related technology development.

-- 1968 to 1971, Director, Pacific Northwest Water Laboratory, Federal Water Quality Administration, U.S. Department of the Interior, Corvallis.

-- 1964 to 1968, Director of Research, Pacific Northwest Water Laboratory. From January, 1968, to August, 1968, he also served as Chief of the Laboratory's National Eutrophication Research Program.

-- 1963 to 1964, Chief of Enforcement Activities, Division of Water Supply and Pollution Control, Federal Water Pollution Control Administration, U.S. Public Health Service, Portland, Or.

-- 1954 to 1963, various positions progressing from Biologist to Deputy Chief, Research Branch, Robert A. Taft Sanitary Engineering Center, U.S. Public Health Service, Cincinnati, Ohio.

-- 1950 to 1954, Biologist, U.S. Public Health Service, Division of Water Pollution Control, Washington, D.C.

-- 1949 to 1950, Biologist, U.S. Public Health Service, Division of Water Pollution Control, Portland, Or.

-- 1945 to 1949, Senior Biologist, State of Wisconsin Committee on Water Pollution, Madison, Wis.

-- 1944 to 1945, Assistant Professor, University of Wisconsin.

-- 1942 to 1944, Served in U.S. Army Air Corps.

-- 1939 to 1942, Instructor, University of Wisconsin.

Education

B.A. in botany, University of Minnesota; Ph.D. in aquatic biology, University of Wisconsin.

Miscellaneous

-- Spent four months in South America in 1957 under auspices of the International Cooperation Administration, principally as a technical consultant to the Brazilian water pollution authority. He also provided consultative assistance on special water problems to health officials in Peru and Panama.

-- Served as Chief of Party for a field team investigating human poisoning through consumption of poisonous fish in the Trust Territory of Pacific Islands in 1958.

-- At the request of the Pan American Health Organization, he served in 1965 as consultant on freshwater biology to the State of Guanabara, Brazil.

-- Served in May, 1974, on a four-member international team assisting the Technological Center of Basic Sanitation, headquartered in Sao Paulo, Brazil, with formulation of planning and management practices for water pollution research.

-- Named Chairman of the Great Lakes Research Advisory Board of the International Joint Commission, U.S. and Canada, in June, 1974.

-- Appointed to Oregon Institute of Technology Environmental Advisory Committee in 1975.

-- Named to Oregon State University Research Center Advisory Committee in 1975.

BARTSCH (con't)

Professional Affiliations

American Society of Limnology and Oceanography, American Fisheries Society, American Public Works Association, Ecological Society of America, American Institute of Biological Sciences, American Association for the Advancement of Science, American Institute of Fisheries Research Biologists, International Association on Water Pollution Research, Water Pollution Control Federation, Federal Sewage Research Association, Pacific Northwest Pollution Control Association, and Sigma Xi.

Honors

Thomas F. Andrews Prize, University of Minnesota, 1935; Gus A. Radebaugh Award, Central States Sewage & Industrial Wastes Association, 1948; U.S. Department of the Interior Honor Award for Meritorious Service, 1969.

BAUMGARTNER, Dr. Donald J. -- Chief, Coastal Pollution Branch.

Experience

-- Has held present position since 1966, directing the Laboratory's nationwide program on the fate and effects of pollutants in near-shore coastal waters. In this capacity he also served on marine pollution advisory panels of the National Academy of Sciences and as a member of the United Nations-sponsored Group of Experts on the Scientific Aspects of Marine Pollution. Also holds faculty appointments at the University of Alaska, University of Washington, and Oregon State University.

-- 1964 to 1966, as a commissioned officer in the U.S. Public Health Service, he was selected for advanced training relating to pollution in large reservoirs and coastal waters, leading to Ph.D. at Oregon State University.

-- 1962 to 1964, Technical Asssitant to the Director of Research at the U.S. Public Health Service's Taft Sanitary Engineering Center, Cincinnati, Ohio. He also worked on pilot plant treatment of municipal wastes for removal of excess nitrogen, served as a representative on NRC-NAS committee assignments relating to oil pollution, and prepared technical reports

such as "Pollution Aspects of Future Levels of Energy Development."

-- 1959 to 1962, assigned to the U.S. Public Health Service's Arctic Health Research Center, working on water supply and waste treatment problems at remote Air Force stations in Alaska.

-- 1957 to 1959, he was selected by the Public Health Service for advanced training at the Massachusetts Institute of Technology. From there he was assigned to the PHS Taft Sanitary Engineering Center to work on pollution characterization methods for industrial wastes.

-- 1955 to 1957, served as a Commission Corps Officer on the Headquarters staff of the Public Health Service's Division of Water Supply and Pollution Control. He was assigned to the newly-formed Basic Data and Economics Section, the forerunner of the Pollution Surveillance Program.

Education

Attended St. Mary's College, Winona, Minn.; B.S. in sanitary engineering, University of Illinois; M.S. in sanitary engineering, Massachusetts Institute of Technology; post-graduate study at the University of Cincinnati; Ph.D. in civil engineering, Oregon State University.

Professional Affiliations

American Association for the Advancement of Science, Pacific Northwest Pollution Control Association, Water Pollution Control Federation, and Sigma Xi.

Honors

Received EPA Bronze Medal Award in 1975.

GAKSTATTER, Dr. Jack H. -- Chief, Eutrophication Survey Branch.

Experience

-- Has held present position since 1972, directing and supervising program operations for EPA's National Eutrophication Survey. Physical, chemical and biological data on more than 800 lakes and their tributaries are being documented in the survey.

-- 1968 to 1972, Principal Limnologist at the University of Iowa's State Hygienic Laboratory in Iowa City, where he conducted water quality investigations throughout the state for the Iowa Water Pollution Control Commission. He also managed the Des Moines Branch Laboratory, an analytical facility devoted primarily to drinking water and waste water analysis.

-- 1966 to 1968, Research Aquatic Biologist at the Federal Water Pollution Control Administration's Southeast Water Laboratory, Athens, Ga., where he conducted research on the uptake and excretion of chlorinated hydrocarbon insecticides by fish.

Education

Attended Wabash College; A.B. in zoology (minor botany), Indiana University; M.S. in public health, University of North Carolina; Ph.D. in environmental chemistry and biology, University of North Carolina; doctoral thesis on "The Uptake From Water by Several Species of Fresh-Water Fish of p, p'-DDT, Dieldrin and Lindane; Their Tissue Distribution and Elimination Rate."

Professional Affiliations

Sigma Xi, American Society of Limnology and Oceanography, Water Pollution Control Federation, and North American Benthological Society.

GARTON, Dr. Ronald R. -- Chief, Western Fish Toxicology Station.

Experience

-- Has held present position since 1974, directing research

GARTON (con't)

on the effects of supersaturation and heavy metals on fish and other aquatic organisms native to the Pacific Northwest.

-- 1972 to 1974, Research Aquatic Biologist at the Western Fish Toxicology Station.

-- 1968 to 1972, Research Aquatic Biologist in the Thermal Pollution Research Branch, Pacific Northwest Environmental Research Laboratory.

-- 1964 to 1968, Research Fellow with the U.S. Public Health Service.

-- 1963, Research Assistant, Michigan State University.

-- 1962, Fishery Aide, U.S. Bureau of Commercial Fisheries.

-- 1958 to 1961, U.S. Naval Officer (currently holds rank of Commander in Reserves).

Education

Attended Montana School of Mines, two years, in geological engineering; B.A. in geology and B.S. in wildlife technology, University of Montana; M.S. and Ph.D. in limnology, Michigan State University. Master's research on effects of lime application on chemistry and productivity of bog lakes; Ph.D. research on effects of metal plating wastes on ecology of warm-water streams.

Professional Affiliations

American Fisheries Society, American Institute of Fishery Research Biologists, Ecological Society of America, Sigma Xi, American Nuclear Society.

GILLETT, Dr. James W. -- Ecologist, Animal Ecology Branch.

Experience

-- Has held present position since 1974, where he serves as project leader for CERL's Terrestrial Microcosm Study.

GILLETT (con't)

The goal of the study is development of a simulated ecosystem which will enable EPA scientists to evaluate the effects of pesticides and other materials added to the environment.

-- 1964 to 1974, Associate Professor, Department of Agricultural Chemistry, Oregon State University. In 1969 he chaired the Symposium on Biological Impact of Pesticides in the Environment, which drew international interest because of its objective discussion of limitations and uses of DDT.

-- 1962 to 1964, post-doctoral research, Department of Entomology, University of California, Berkeley.

Education

B.S. in chemistry, University of Kansas; Ph.D. in bio-chemistry, University of California, Berkeley.

Professional Affiliations

American Association for the Advancement of Science, American Chemical Society, New York Academy of Sciences, and Sigma Xi.

GLASS, Dr. Norman R. -- Director, National Ecological Research Laboratory.

Experience

-- Has held present position since 1972, where he has directed the Laboratory's research on the ecological effects of pollution. Primary areas of concern to the laboratory are the effects of the six major air pollutants, heavy metals, pesticides and toxic materials on plant and animal populations and on whole ecosystems. He also holds a professorial appointment in the Department of Fisheries and Wildlife at Oregon State University and is an appointed member of the Graduate Faculty there.

-- 1971 to 1972, Physical Science Administrator on the Special Projects Staff of EPA's Office of Research and Development, Washington, D.C., where he was the delegated representative

GLASS (con't)

of the Assistant and Deputy Assistant Administrator in intra-agency, interagency, and international matters involving environmental research. While serving on the joint U.S.--Canadian Steering Committee, coordinating Great Lakes pollution research, he was jointly appointed as Associate Director of the Project Office of the International Field Year on the Great Lakes, an office administered by the National Oceanic and Atmospheric Administration.

-- 1968 to 1971, Assistant Research Systems Analyst at the University of California's Institute of Ecology at Davis. During this period he also was employed by the RAND Corporation as a consultant-contractor (annual appointment) for the Department of Environmental Sciences.

-- 1963 to 1968, he held several positions in the Department of Zoology and the Institute of Ecology, University of California-Davis (as student): Research Assistant, Teaching Assistant, Computer Programmer, and Laboratory Technician.

-- 1963, Laboratory Technician, Shell Chemical Company, Pittsburg, Ca.

-- 1960 to 1962, analytical chemistry work at the Dow Chemical Company, Pittsburg, Ca.

Education

Attended Diablo Valley College, Concord, Ca.; B.A. in Zoology, University of California, Ph.D. in zoology, University of California at Davis, with specialization in animal ecology, biomathematics and fisheries.

GORDON, Dr. Ronald C. -- Research Microbiologist, Arctic Environmental Research Laboratory.

Experience

-- Has held present position since 1967.

GORDON (con't)

-- 1962 to 1966, Graduate Research Assistant, Department of Microbiology at McGill University's Macdonald College, Montreal, Canada.

-- January 1965 to May 1965, Microbiology Teaching Assistant, Macdonald College, McGill University.

-- 1961 to 1962, Graduate Research Assistant and Bacteriology Teaching Assistant, Department of Bacteriology, South Dakota State University.

-- June 1960 to August 1960, Junior Bacteriologist, South Dakota State Public Health Laboratory, Brookings, S.D.

-- 1957 to 1958, served in U.S. Navy.

-- 1956 to 1957, served in U.S. Marine Corps.

Education

B.S. and M.Sc. in bacteriology, South Dakota State University; Ph.D. in microbiology, McGill University.

Professional Affiliations

American Society for Microbiology, Canadian Society for Microbiologists, Arctic Institute of North America, American Association for the Advancement of science, Water Pollution Control Federation, and Alaska Water Management Association.

KARI, Earl N. -- Deputy Director.

Experience

-- Has held present position since 1971, sharing fully with the Director in the planning and direction of the national research and development programs of CERL and, previously, for the nine laboratories and six field stations making up the National Environmental Research Center.

KARI (con't)

-- 1970 to 1971, Regional Director, Ohio River Basin, Federal Water Quality Administration, Cincinnati, Ohio. At that position he was in charge of the planning, programming, policy implementation, direction and control of the technical and administrative aspects of all FWQA activities in the Ohio River Basin (including Indiana, Ohio, Kentucky, West Virginia, and Western Pennsylvania). He administered provisions of Federal legislation for water pollution control through technical assistance, financial aid to states and municipalities, basin planning, surveillance, enforcement, research and training (annual budget of approximately $100 million).

-- 1969 to 1970, Deputy Regional Director, Northwest Region, Federal Water Pollution Control Administration, Portland, Or. His responsibilities were similar to those in the above position, but involved the states of Oregon, Washington, Idaho, Montana and Alaska.

-- 1960 to 1969, Director of Enforcement and Director of Technical Support, Northwest Region, Federal Water Pollution Control Authority, Portland, Or. There he directed a study on the effects of wastes from the pulp and paper industry on the marine resources of Puget Sound. The study resulted in the eventual installation of $140 million worth of waste treatment facilities. He also directed initial environmental studies on effects of the proposed Alaska oil pipeline.

-- 1959 to 1960, Hydraulic Engineer, Oregon State Fish Commission, Portland where he evaluated the effects of hydroelectric projects on the fishery resource.

-- 1957 to 1959, Sanitary Engineer, Oregon State Sanitary Authority, where he helped conduct water quality surveys of most streams in Oregon and conducted in-plant efficiency surveys of selected industrial and municipal waste treatment facilities.

Education

B.S. in civil engineering, University of Washington; M.S. in civil engineering, Oregon State University.

Honors

Received EPA Bronze Medal Award in 1975.

KRAWCZYK, Daniel F. -- Chief, Laboratory Services Branch.

Experience

-- Has held present position since 1966, directing a laboratory service providing CERL and preceding organizations with routine chemical analyses, computer assistance, electronic repair and modification, routine glass repair, and glassblowing.

-- 1960 to 1966, Great Lakes Region of the U.S. Public Health Service's Division of Water Pollution Control, where he was involved in International Joint Commission Studies, the Detroit River-Lake Erie Enforcement Project, and the Illinois River-Great Lakes Comprehensive Study.

-- 1949 to 1960, Buffalo (N.Y.) Sewer Authority, where he progressed from junior chemist to Chief chemist.

-- 1948 to 1949, research chemist in the field of air pollution with the Dustex Corporation.

Education

B.A. in chemistry, University of Buffalo; M.S. in chemistry, Canisius College.

Professional Affiliations

American Chemical Society and the Water Pollution Control Federation. He is also a member of EPA's Quality Control Coordinators group and represents the Laboratory at EPA Analytical Quality Control functions.

LATIMER, Richard W. -- Director, Arctic Environmental Research Laboratory.

Experience

-- Has held present position since 1969, directing a wide range of research on environmental problems which are unique to cold climates, including development of technology to deal with those problems.

LATIMER (con't)

-- 1968 to 1969, Research and Development Program Specialist, Federal Water Pollution Control Administration, Portland, Or.

-- 1967 to 1968, Civil Engineer, U.S. Bureau of Reclamation, Sacramento, Ca.

-- 1966 to 1967, Conservation Work Programs Planner, U.S. Bureau of Reclamation, Sacramento, Ca.

-- 1964 to 1966, Conservation Center Director, U.S. Bureau of Reclamation, Sacramento, Ca.

-- April 1964 to November 1964, Supervisory Construction Engineer, U.S. Bureau of Reclamation, Weber Basin Project, Ogden, Utah.

-- 1962 to 1964, Supervisory Civil Engineer, U.S. Bureau of Reclamation, Weber Basin Project, Ogden, Utah.

-- 1960 to 1962, Civil Engineer, U.S. Bureau of Reclamation, Weber Basin Project, Ogden, Utah.

-- 1956 to 1959 and October to November, 1962, served as Navigator-Bombardier in the U.S. Air Force.

-- 1955 to 1956, Engineer, Metropolitan Engineers, Salt Lake City, Utah.

Education

B.A. in engineering, University of Utah; graduate work in engineering, University of Utah; and graduate studies in public administation, University of Washington.

Professional Affiliations

Water Pollution Control Federation, Alaska Water Management Association, American Public Works Association, Interagency Technical Committee for Alaska, and Fairbanks Federal Executive Association.

Honors

Received NIPA Career Education Fellowship in 1966 and Meritorious Service Award in 1965.

LEFOHN, Dr. Allen S. -- Chief, Animal Ecology Branch.

Experience

-- Has held present position since 1973, directing studies on the effects of air pollution, pesticides and energy production on animal life.

-- 1971 to 1973, Special Projects Staff, EPA Office of Research and Monitoring, Washington, D.C., where he was responsible for implementing and monitoring the National Eutrophication Survey. He also coordinated, within OR&M plans, for the New Federal Clean Water Act. Other activities included recommending monitoring systems for air and water pollution programs and initiating the establishment of an aircraft remote and in-situ sensing program within EPA.

-- April 1971 to December 1971, assigned to Atmospheric Chemistry and Physics Branch at EPA's National Environmental Research Center in North Carolina, where he established an infrared analysis laboratory for use in investigating auto exhaust and other gaseous substances. During this period he also served as advisor to EPA's Deputy Assistant Administrator for Monitoring and served as an active liaison with other Federal agencies for establishing cooperative scientific monitoring efforts.

-- 1969 to 1971, National Academy of Sciences Associate with the National Aeronautics and Space Administration, Houston, where he established an infrared emission laboratory for obtaining thermal emission spectra of typical terrestrial targets. Served on several environmental monitoring committees at the Manned Spacecraft Center, and authored a special report to NASA on "Environmental Pollution-NASA's Role in the Abatement Program."

Education

B.S. in chemistry, University of California at Los Angeles; Ph.D. in physical chemistry, University of California at Berkeley.

Professional Affiliations

Optical Society of America, American Association for the Advancement of Science, and Sigma Xi.

LEWIS, Dr. Robert A. -- Environmental Physiologist, Animal Ecology Branch.

Experience

-- Has held present position since 1973, serving a two-year assignment with EPA under the Inter-Governmental Personnel Act. Dr. Lewis is project leader in CERL's Montana Coal-Fired Power Plant Project, a major field and laboratory investigation of the effects of air pollution from coal-fired power plants on a grassland ecosystem. He also maintains status as Research Associate with the Department of Zoology, University of Washington.

-- 1966 to 1973, Acting Director, Zoologist and Manager, Avian Physiology Laboratory, Department of Zoology, University of Washington, where he was directly responsible for the procurement and management of an experimental colony of approximately 1,500 birds.

-- 1965, Instructor, Department of Zoology, Washington State University.

-- 1963, Assistant Professor and Acting Department Chairman, Department of Biology, Monroe Community College, State University of New York, Rochester.

-- 1960 to 1962, member of the Governor's Committee on Disease Control, Trenton, N.J.

-- 1960 to 1961, Field Representative, Veterinary Public Health, Division of Environmental Medicine, Department of Health, State of New Jersey.

-- 1958 to 1960, Assistant Curator of Vertebrate Collections, Natural History Department, Ohio Historical Museum, Columbus, Ohio. In 1959 he was also a field instructor in ornithology, Department of Zoology and Entomology, Ohio State University.

-- 1955 to 1958, served with Headquarters Company of the U.S. Army's 11th Airborne Division. During much of that time he was an administrative assistant at the Flak Education Center in Augsberg, West Germany.

Education

B.S. in zoology, Ohio State University; M.S. in zoology, Rutgers, The State University; and Ph.D. in zoology, University of Washington.

LOTSPEICH, Dr. Frederick B. -- Research Physical Scientist, Arctic Environmental Research Laboratory.

Experience

-- Has held present position since 1966.

-- 1957 to 1966, Research Soil Scientist, Agricultural Research Service, Bushland, Texas.

-- 1954 to 1957, Research Soil Scientist, U.S. Geological Survey, Geochemical Exploration Section, Denver, Colo.

-- 1940 to 1945, served with U.S. Army Artillery in the Southwest Pacific, earning the Silver Star in New Guinea, 1943. He also served in the U.S. Army Reserves from 1958 to 1973 (retired).

Education

B.S. in soil science, Washington State University; M.S. in soil science (pedology), Washington State University; and Ph.D. in soil science (pedology), with minors in chemistry, geology and plant ecology, Washington State University.

Professional Affiliations

Soil Science Society of America, Ecological Society of America, American Association for the Advancement of Science, American Institute of Biological Science, American Federation of Scientists, and Interagency Technical Committee for Alaska.

MALONEY, Thomas E. -- Chief, Eutrophication and Lake Restoration Branch.

Experience

-- Has held present position since 1972, directing the development, coordination and review of research and development programs on a national scale to provide control of accelerated eutrophication, including lake restoration technology.

MALONEY (con't)

-- 1968 to 1972, Chief of the Physiology Section and Acting Chief of the National Eutrophication Research Program at the Pacific Northwest Environmental Research Laboratory, Corvallis.

-- 1966 to 1968, Chief of the Plankton Section, National Marine Water Quality Laboratory, Federal Water Pollution Control Administration, West Kington, R.I.

-- 1956 to 1965, in charge of plankton studies in the Aquatic Biology Section of the U.S. Public Health Service's Cincinnati Water Research Laboratory, Robert A. Taft Sanitary Engineering Center, Cincinnati, Ohio. In 1965 he and his research unit received a Citation for Superior Performance from the Secretary of Health, Education and Welfare for their role in the development of methods for the analysis of endrin as a cause of fish kills on the Mississippi River.

-- 1952 to 1956, Biologist for Water Pollution Research, Cincinnati Water Research Laboratory, Robert A. Taft Sanitary Engineering Center.

-- 1951 to 1952, Biological Aid and Biologist, Cincinnati Water Laboratory, Robert A. Taft Sanitary Engineering Center.

Education

B.A. and M.A. in biology, University of Buffalo; post-graduate studies at the University of Cincinnati and the University of Michigan.

Professional Affiliations

Chairman, Biostimulation Joint Task Group for Standard Methods for the Examination of Water and Wastewater; Chairman, Phytoplankton Subcommittee of Standard Methods for the Examination of Water and Wastewater; Chairman, Subcommittee on Plankton, EPA Biological Advisory Committee; Sigma Xi; American Society of Plant Pathologists; American Society of Limnology

MALONEY (con't)

and Oceanography; Phycological Society of America; Marine Biological Association of the United Kingdom; Water Pollution Control Federation; and American Association for the Advancement of Science.

MALUEG, Dr. Kenneth W. -- Chief, Lake Restoration Section, Eutrophication and Lake Restoration Branch.

Experience

-- Has held present position since 1971.

-- 1967 to 1971, Chief, Nutrient Control Section, National Eutrophication Research Program, Pacific Northwest Water Laboratory, Federal Water Pollution Control Administation.

-- 1966 to 1967, Aquatic Biologist/Limnologist, Effects of Impoundment on Water Quality Program, Federal Water Pollution Control Administration, Corvallis.

Education

B.S. in zoology, University of Wisconsin, Madison; M.S. in zoology (botany), University of Wisconsin; Ph.D. (zoology, limnology), University of Wisconsin; doctoral thesis on "An Ecological Study of Chaoborus."

Professional Affiliations

American Institute of Biological Sciences, American Society of Limnology and Oceanography, Sigma Xi, and Societas Internationalis Limnologiae.

McCARTY, James C. -- Director, Program Coordination Staff.

Experience

-- Has held present position since 1972, directing program planning coordination for CERL and, previously, the nine laboratories and six field stations making up the National Environmental Research Center.

McCARTY (con't)

-- 1971 to 1972, Director, Surveillance & Analysis Division, U.S. Environmental Protection Agency, Region IX, San Francisco.

-- 1969 to 1971, Deputy Regional Director, Federal Water Pollution Control Administration, Southwest Region.

-- 1967 to 1968, Director, Technical Programs, Federal Water Pollution Control Administration, Southwest Region.

-- 1965 to 1967, Deputy Director, Central Pacific River Basins Project, Federal Water Pollution Control Administration, Southwest Region.

-- 1962 to 1965, Chief, Water Resources Section, Division of Water Supply and Pollution Control, U.S. Public Health Service, Region IX, San Francisco.

-- 1961 to 1962, Project Engineer, San Francisco Bay Pollution Investigations, Sanitary Engineering Research Laboratory, University of California, Berkeley.

-- 1958 to 1960, Water Pollution Control Engineer, Central Valley Regional Water Quality Control Board, Sacramento.

-- 1954 to 1957, Sanitary Engineer, Civil Engineers, Inc. (engineering consultants), Detroit, Mich.

-- 1952 to 1954, Hydraulic Engineer, U.S. Corps of Engineers, Detroit District, Detroit, Mich.

-- 1951 to 1952, Construction Engineer, E.I. du Pont DeNemours & Co., South Carolina.

Education

B.S. in civil engineering, Wayne State University; M.S. in sanitary engineering, University of Michigan.

Professional Affiliations

Registered Professional Engineer in Michigan and California, American Society of Civil Engineers, Water Pollution Control Federation, American Society of Limnology and Oceanography, Tau Beta Pi (engineering), Chi Epsilon (civil engineering), and Delta Omega (public health).

McCARTY (con't)

Honors

Received EPA Bronze Medal Award in 1975.

MILLER, William E. -- Chief, Physiology Section, Eutrophication and Lake Restoration Branch.

Experience

-- Has worked at present post since 1967, directing a research program to develop, refine and conduct laboratory and in situ field bioassays to measure, predict and categorize the responses of aquatic plants (both freshwater and estuarine) to specific additions or reductions of nutrients and waste discharges.

-- 1964 to 1967, Field Project Leader at the U.S. Public Health Service's Klamath Lake Project, Klamath Falls, Or., where he evaluated the nuisance blooms of algae in Upper Klamath Lake.

-- 1962 to 1964, Chief Chemist, U.S. Public Health Service's Raritan Bay Project, Metuchen, N.J., where he was responsible for formulation of a chemical investigation program to assess the pollution of Raritan Bay and its adjacent drainage basin.

-- 1960 to 1962, Chemist, U.S. Geological Survey Water Quality Branch, Worland, Wyo., where he was in charge of laboratory analysis, evaluation and compilation of basic water quality data from samples collected from the major rivers and streams in Montana and Wyoming.

Education

B.S. in chemistry, Dickinson State College.

OMERNIK, James M. -- Chief, Land Use-Photo Interpretation Section, Eutrophication Survey Branch.

OMERNIK (con't)

Experience

-- Has held present position since 1972, where he has been responsible for the development and presentation of Lake Survey data on relationships between drainage area characteristics (mainly land use) and non-point source nutrients in streams. Also works with the macro aspects of animal unit densities, soils, slope, stream discharge and climate. Other responsibilities include cartographic design and supervision of map compilation for maps to accompany program lake reports.

-- 1963 to 1972, Intelligence Research Specialist, Defense Intelligence Agency, Washington, D.C., where he was responsible for the development and presentation of military geographic feasibility studies involving research and analysis of environmental phenomena related to military operations.

-- 1962 to 1963, Cartographic Technician (compilation), U.S. Topographic Command, Washington, D.C., where he reviewed compilations prepared by the mapping branch.

-- 1961 to 1962, Cartographic Technician (photogrammetry), U.S. Topographic Command, Washington, D.C., where he prepared and revised stereo-compilations of topographic map manuscripts from aerial photography.

Education

B.S. in geography, University of Wisconsin at Eau Claire; postgraduate study in geography and cartography at the University of Kansas.

Professional Affiliations

Association of American Geographers.

POWERS, Dr. Charles F. -- Chief, Ecosystems Analysis and Methodology Section, Eutrophication and Lake Restoration Branch.

POWERS (con't)

Experience

-- Has held present position since 1968.

-- 1955 to 1968, on staff of Department of Zoology and the Great Lakes Research Division, University of Michigan.

-- Served for 2 1/2 years in the U.S. Navy during World War II.

Education

B.A. in zoology, University of North Carolina; Ph.D. (oceanography, limnology, and ichthyology), Cornell University.

Professional Affiliations

Sigma Xi, Phi Kappa Phi, American Society of Limnology and Oceanography, International Association for Great Lakes Research, International Association of Theoretical and Applied Limnology, and the American Association for the Advancement of Science.

PUCHTLER, Bertold -- Chief, Alaska Village Demonstration Projects.

Experience

-- Has held present position with the Arctic Environmental Research Laboratory since 1974.

-- 1970 to 1974, Project Advisor, Arctic Environmental Research Laboratory.

-- 1965 to 1970, Chief of Field Station, U.S. Agency for International Development, Vang Vieng, Laos.

-- 1965, Counselor, The Advancement School, Winston-Salem, N.C.

-- 1962 to 1964, Teacher, American Peace Corps, Nepal.

PUCHTLER (con't)

Education

B.A. in history, Wesleyan University; M.A. in history, University of California; post-graduate course in rural development, University of California.

Professional Affiliations

Society for Applied Anthropology, Alaska Water Management Association.

Honors

Woodrow Wilson Fellow, 1961 to 1962.

RAINWATER, Frank H. -- Acting Director, Pacific Northwest Environmental Research Laboratory.

Experience

-- Has held present position since July, 1975.

-- 1968 to 1975, Chief of EPA's Thermal Pollution Branch at the Pacific Northwest Environmental Research Laboratory and preceding organizations in Corvallis. In that capacity he directed a multi-discipline R&D program on quantification of aqueous pollutants (primarily from electric power generation and new synthetic fuel processes) and economics and methods of their control.

-- 1963 to 1968, U.S. Public Health Service and Federal Water Pollution Control Administration, Washington, D.C., responsible for development of comprehensive river-basin program plans for water pollution control. He served as Western Operations Officer from 1963 to 1966, responsible for planning and performance of all projects west of the Mississippi River, and was promoted in January, 1967, to Division Director with nationwide responsibilities for the program.

-- 1961 to 1963, Chief Hydrologist, U.S. Public Health Service, Washington, D.C., where he directed efforts to develop and implement methodology to integrate water quality factors in Federal water resources development projects.

RAINWATER (con't)

-- 1955 to 1961, Staff Scientist, U.S. Geological Survey, Washington, D.C. performing special assignments related to water quality hydrology and sedimentation, national characteristics, station network design, etc.

-- 1948 to 1955, Chemist, U.S. Geological Survey, Lincoln, Neb.

Education

B.A. (chemistry, math, economics), Hardin-Simmons University; M.S. (sanitary chemistry and bacteriology), University of Colorado; post-graduate studies in hydrology, geology, and statistics.

RANIERE, Dr. Lawrence C. -- Chief, Plant Ecology Branch.

Experience

-- Has held present position since 1973, directing air pollution effects research providing a scientific basis for national secondary air quality standards and means of controlling air pollutants in general.

-- 1970 to 1973, worked in Federal Air Pollution Control Program at Research Triangle Park, N.C., as Air Quality Criteria and Standards Development Officer. Served as Staff Program Planner for Bureau of Air Pollution Sciences. Appointed Deputy for Division of Ecological Effects and served as Acting Director for six months.

-- 1968 to 1970, Program Analyst, Office of Plans and Programs, Environmental Science Services Administration, U.S. Department of Commerce, Rockville, MD.

-- January to October, 1968, called to active duty with U.S. Air Force following Pueblo incident. Served as Staff Weather Officer (rank of major) at Tactical Air Command Headquarters, Langley Air Force Base, Va.

-- 1965 to 1968, Agricultural Services Coordinator, Office of User Affairs, Environmental Science Services Administration, where he was responsible for liaison with agri-business and scientific representatives to provide a focal point for improving ESSA agricultural and forestry weather services.

RAINERE (con't)

-- 1961 to 1965, Advisory Agricultural Meteorologist, U.S. Weather Bureau Agricultural Service Office at Rutgers, The State University, New Brunswick, N.J.

-- 1958 to 1961, Plant Pathologist, U.S. Department of Agriculture, stationed at Rutgers, The State University, responsible for research on diseases of cranberry and blueberry.

-- 1957 to 1958, Associate Research Specialist in plant pathology, University of Delaware.

-- 1952 to 1958, served as Weather Officer with U.S. Air Force, stationed in West Germany and responsible for producing forecasts and briefing air crews.

Education

B.A. in botany and plant pathology, Utah State University; attended University of New Mexico for one year of training in meteorology with U.S. Air Force; M.S. in plant pathology and entomology, University of Delaware; Ph.D. from Rutgers with split majors in plant pathology, microclimatology and nematology.

Professional Affiliations

American Meteorological Society, American Phytopathological Society, Sigma Xi, American Association for the Advancement of Science, Agricultural Research Institute of the National Academy of Sciences, and the Agricultural Meteorology Committee of the American Meteorological Society.

SCHALLOCK, Eldor W. -- Research Aquatic Biologist, Arctic Environmental Research Laboratory.

Experience

-- Has held present position since 1968.

-- 1964 to 1967, Fisheries Biologist, Alaska Department of Fish and Game, Fairbanks.

SCHALLOCK (con't)

-- 1962 to 1964, Graduate Student and Fisheries Biologist, University of Alaska, Department of Wildlife Management.

-- May 1962 to August 1962, Fisheries Biologist and Field Leader, Alaska Department of Fish and Game.

-- May 1961 to September 1961, Crew Leader, U.S. Fish and Wildlife Service, Bureau of Sport Fish and Wildlife.

-- June 1960 to December 1960, Crew Leader and Laboratory Technician, Biological Sciences and Paleontology Department, University of Alaska.

Education

B.S. and M.S. in biological sciences and fisheries, University of Alaska; graduate study in water pollution, University of Alaska.

Professional Affiliations

Alaska Water Management Association, American Fisheries Society, Interagency Fish and Wildlife Technical Committee.

Honors

U.S. Fish and Wildlife Service Research Fellowship (9/62 to 8/63 and 9/63 to 7/64), and Outstanding Service Award from the Federal Water Pollution Control Administration, 1969.

SEYB, Dr. Leslie P. -- Deputy Director, Pacific Northwest Environmental Research Laboratory.

Experience

-- Has held present position since 1970, sharing with the Director the responsibility for planning, developing and organizing the overall effort of the Laboratory's five national research programs and laboratory service group.

SEYB (con't)

-- 1964 to 1970, Supervisory General Physical Scientist, Pacific Northwest Water Laboratory, Corvallis. He organized the Physical Sciences Section at the laboratory and supervised all chemical analysis and the development and evaluation of new analytical procedures in organic and inorganic chemistry. He was detailed as Assistant to the Laboratory Director from 1968 to early 1970, when he became Acting Deputy Director.

-- 1942 to 1964, progressed from Group Leader, to Manager of Research, to Associate Director of Research with the Diamond Alkali Company, where he performed and supervised bench scale research and pilot plant operations for the development of new products and improvement of existing products. More than 100 patents resulted from the 30-professional staff he supervised.

-- 1939 to 1942, employed by Phillips Petroleum Company, preparing and processing patent applications related to refinery processes.

Education

B.A. in chemistry, Coe College; M.S. and Ph.D. in organic chemistry, State University of Iowa.

Professional Affiliations

American Chemical Society, Sigma Xi, and Water Pollution Control Federation.

SHIRAZI, Dr. Mostafa A. -- Mechanical Engineer, Thermal Pollution Branch.

Experience

-- Has held present position since 1969, where he plans, conducts and directs research leading to prediction of thermal plume behavior. As EPA's expert on thermal plume behavior, he reviews environmental impact statements and provides testimony in court litigation. He also evaluates and monitors research grants related to economics and thermodynamic performance of power plant cooling systems and other energy-related projects.

SHIRAZI (con't)

-- 1966 to 1969, Senior Research Engineer, Allegany Ballistics Laboratory, Hercules, Inc., Cumberland, Md., where he was involved in the analysis and model testing of rocket nozzles, including two-phase flow, shock wave and jet interaction gas dynamics.

-- 1964 to 1966, Teaching Assistant, Department of Mechanical Engineering, University of Illinois, Urbana.

-- 1961 to 1964, Research Assistant, Digital Computer Laboratory, University of Illinois.

-- January 1961 to September 1961, Associate Research Engineer, Transport Division, Boeing Company, Renton, Wa., where he performed analyses on 727 jet engine inlet pressure distribution, curve-fitting to the thermodynamics properties of air, heat transfer, and heat exchanger design.

-- 1960 to 1961, Research Assistant, Engineering Experiment Station, University of Washington, Seattle, where he was in charge of a small computer laboratory.

-- 1959 to 1960, Research Assistant, Department of Oceanography, University of Washington, where he helped build a computer model of Puget Sound .

Education

B.S. in mechanical engineering, California State University;
M.S. in mechanical engineering, University of Washington;
Ph.D. in mechanical engineering, University of Illinois.

Honors

Dr. Shirazi received the Spirit of Hercules Award from the Allegany Ballistics Laboratory while employed there, and was Awarded the EPA Bronze Medal in 1975. He also holds a courtesy professorship with Oregon State University and is listed in "Who's Who in the West" and "American Men of Science."

SWARTZ, Dr. Richard C. -- Chief, Newport Field Station.

Experience

-- Has held present position since 1972, directing the Field Station's research on the behavior and effects of pollutants in the marine environment.

-- 1971 to 1972, Associate Marine Scientist, Virginia Institute of Marine Science; and Assistant Professor at the College of William and Mary and the University of Virginia.

-- 1968 to 1971, National Science Foundation Trainee, School of Marine Science, College of William and Mary. Also worked as Teaching Assistant in biological oceanography from 1968 to 1969.

-- 1966 to 1968, Research Assistant, Department of Applied Biology, Virginia Institute of Marine Science.

-- 1964 to 1966, Biological Oceanographer, Hydrobiology Branch, National Oceanographic Data Center.

-- 1962 to 1963, Student Trainee in Oceanography, National Oceanographic Data Center.

Education

B.A. in biology, Johns Hopkins University; Ph.D. in biological oceanography, College of William and Mary.

Professional Affiliations

Animal Behavior Society, American Institute of Biological Sciences, American Association for the Advancement of Science.

TICHENOR, Dr. Bruce A. -- Acting Chief, Thermal Pollution Branch.

Experience

-- Has held present position since July, 1975.

-- 1971 to 1975, Chief, Ecology Section, Thermal Pollution Branch, Pacific Northwest Environmental Research Laboratory, Corvallis, where he was responsible for planning, coordinating, and conducting in-house research on the environmental

TICHENOR (con't)

impact of thermal power plant cooling systems, as well as research on the transport and behavior of heat in water. His duties included monitoring of extramural research and development projects in these areas, and in the field of advanced waste heat control systems (e.g., wet/dry cooling towers).

-- 1968 to 1971, Chief, Hydrographic Branch, National Thermal Pollution Research Program, Pacific Northwest Water Laboratory, Corvallis.

-- 1967 to 1968, Acting Chief, Power Production, Pacific Northwest Water Laboratory, Federal Water Pollution Control Administration, Corvallis.

-- 1966 to 1967, Project Leader, Techniques of Planning Project, Pacific Northwest Water Laboratory.

Education

B.S. in civil engineering (sanitary engineering), Portland State College and Oregon State University; Ph.D. in civil engineering (sanitary engineering), Oregon State University, Doctoral thesis dealt with processes of heat exchange due to evaporation from flowing streams.

Professional Affiliations

American Society of Civil Engineers (serving on subcommittee on Thermal Effects in the Environmental Engineering Division). Dr. Tichenor is also a Registered Professional Engineer in the State of Oregon.

Miscellaneous

Dr. Tichenor conducted a Federal study on the feasibility of alternative cooling systems for thermal power plants near Lake Michigan and was responsible for presenting the results at two sessions of the Lake Michigan Enforcement Conference and at public hearings in the States of Michigan, Wisconsin, and Indiana.

In addition to his research activities, Dr. Tichenor acts as a technical consultant to EPA operational programs. He recently received EPA's Bronze Medal for Commendable Service in recognition of those contributions.

TINGEY, Dr. David T. -- Plant Pathologist.

Experience

-- Has held present position since 1973, responsible for a program to assess the physiological and biochemical effects of pollutants on plant systems. He also holds a courtesy appointment as Professor of Botany at Oregon State University.

-- 1972 to 1973, Plant Physiologist, Division of Ecological Research, National Environmental Research Center, Research Triangle Park, N.C.

-- 1971 to 1972, Public Health Service Trainee, assigned to North Carolina State University to study plant physiology and cell biology.

-- 1969 to 1971, Plant Physiologist, Division of Effects Research, Environmental Protection Agency, stationed at North Carolina State University to conduct studies on the effects of air pollutants on plant growth.

-- 1968 to 1969, Botanist, Air Pollution Control Office, Cincinnati, Ohio.

-- 1968, Commissioned as officer in U.S. Public Health Service.

-- 1966 to 1968, U.S. Public Health Service Air Pollution Science Trainee, University of Utah.

Education

B.A. in biology education and M.A. in botany (minor in air pollution science), University of Utah; Ph.D. in plant physiology (minor in cell biology), North Carolina State University.

Professional Affiliations

Phi Sigma, Sigma Xi, Phi Kappa Phi, American Society of Plant Physiologists, Societas Plysiologiae Plantarum Scandinavica, American Society of Agronomy, Crop Science Society of America.

LARSEN, Dr. David P. -- Research Aquatic Biologist, Eutrophication and Lake Restoration Branch

Experience

-- Has held present position sice 1972, in which his research has been associated with the Shagawa Lake Restoration Project.

-- 1968 to 1972, graduate student.

-- 1964 to 1967, deck officer, U.S. Coast Guard.

Education

B.A. in zoology, Pomona College; Ph.D. in oceanography (biology, phytoplankton ecology), Oregon State University.

Professional Affiliations

American Society of Limnology and Oceanography.